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SOME PETROLOGICAL INDICATORS OF ZECHSTEIN/ROTLIEGEND
BOUNDARY IN THE EASTERN PART OF THE NORTH-SUDETIC BASIN

Abstract: Separation of marine Zechstein/continental Rotliegend boundary makes serious scientific problem. Effort to solve it includes analysis of fossils and sedimentological structures. It seems that in this research, petrological features of studied sedimentary rocks can be used. In this study, it was suggested to use the features as: cement's composition of clastic sediments, composition of grains and their degree of roundness and mineralogical identification of material from cavities and veins in carbonate rocks.

Keywords: North-Sudetic Basin, Zechstein/Rotliegend boundary, clastic rocks

INTRODUCTION

The North-Sudetic Basin is a geological unit, which is a part of Western Sudetes Mountains. It is divided into two stages: metamorphic; which belongs to Early Paleozoic (Cambrian - Silurian), and sedimentary one; which was deposited in Late Carboniferous (Stephanian A-C), Permian, and Late Cretaceous (Cenomanian-Santonian) (Fig. 1).

An alternate continental, and marine sedimentation took place in this area. (Piątkowski 1966). Rotliegend deposits (excluding sediments, which occur right under the Basal Limestone) were formed in the continental environment. There are mainly clastic rocks (sandstones and conglomerates) and volcanic rocks (rhyolites, basalts and their tuffs). Zechstein deposits are mostly represented by limestones, dolomites, and sandstones. They were deposited in the marginal parts of Zechstein Basin, which was developed in greater part of Europe.

ZECHSTEIN/ROTLIEGEND BOUNDARY PROBLEM

Separation of Zechstein/Rotliegend boundary is a very serious problem. It is considered that this boundary should be separated between continental and marine sediments, but it is very difficult to do. Directly under sediments of the Basal Limestone occurs deposits of the Border Conglomerate. They are represented by red and gray sandstones, conglomeratic sandstones rarely conglomerates. Their stratigraphic position and origin arouse a great controversy. Despite finding fauna in those sediments (Riedel 1917, Raczyński 1996) this problem hasn't been solved yet.

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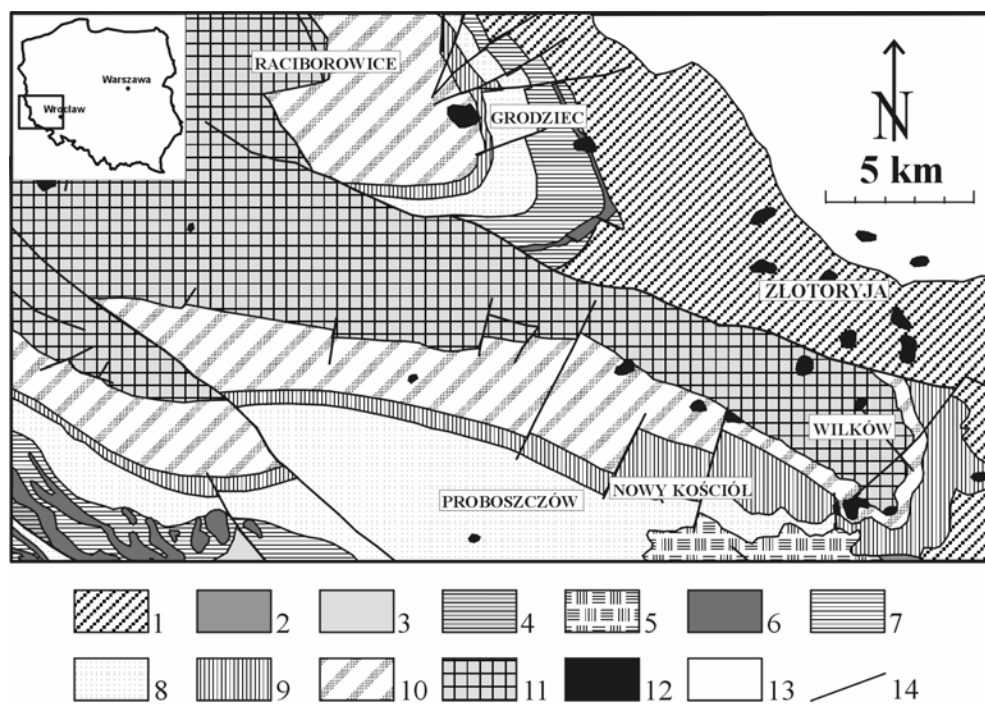


Fig. 1. Geological sketch map (simplified and without Quaternary) showing eastern part of North-Sudetic Basin with special consideration of Permian (according to Milewicz, Szałamacha J., Szałamacha M., 1979): Ordovician – 1: gray metaschists with quartzite lenses and enclosures; Silurian – 2: massive greenstones, greschits with diabases and pillow lavas; Upper Carboniferous – 3: mudstones, fine-grained sandstones, secondary conglomerates; Permian – Lower Rotliegend – 4: mudstones with sandstone enclosures and conglomerates; Middle Rotliegend – 5: rhyolite and its tuffs or rhyodacites and trachytes; 6: trachybasalt and melaphyre; 7: mudstones, secondary sandstones and conglomerates; Upper Rotliegend – 8: conglomerate with different-grained sandstones enclosures; Zechstein – 9: sandstones, claystones, limestones, dolomites, anhydrites, gypsums; Triassic – 10: variegated sandstones, quartz sandstones, claystones, dolomites, limestones, marls; Upper Cretaceous – 11: quartz sandstones, conglomerates, marls, limestones, claystones, mudstones; Tertiary – 12: basalts and basalt tuffs; 13: sands, gravel, silts and clays; 14: faults

Most authors agree that those sediments are of marine origin and should be treated as Zechstein (Richter-Bernburg 1951, Gunia 1962). Some believe that those formations are from Rotliegend. According to other views - decolorized sandstones, which were redeposited in the Zechstein Sea, are accepted as a Zechstein. However, decolorized, non redeposited sediments belong to Rotliegendes (Oberc, Tomaszewski 1963).

Almost all authors agree that Zechstein/Rotliegend boundary should be marked between continental and marine sediments. Peryt (1976) is on different opinion - he agreed that Border Conglomerate was formed in the marine environment. Since it is very difficult to separate continental/marine sediments boundary, this author suggested using only one criterion, in separation of Rotliegend/Zechstein boundary, which was lithological development of sediments.

In spite of all agreements of most authors about Zechstein age of border conglomerate, problem with separation of Zechstein/Rotliegend boundary is still unsolved. Dividing on Roteliegend and Weissligend (which belongs to Zechstein) is not doing its function. It often happens, that decolorized sediments are devoid of faunas, however fauna is found in the red sediments (Lisiakiewicz 1978). Contents in calcium carbonate is inadequate criteria to this purpose, because-according to Wyżykowski (1964) - calcium minerals can be deposited in cement during sedimentation in the desert environment.

CONCLUDING REMARKS

So far, unquestionable evidence for Zechstein age of the Border Conglomerate is presence of fauna. It seems though, that there weren't used all possibilities of applied petrological methods. In this purpose precise analysis of grains features such as shape, roundness, and mineral composition needs to be done. It may let to reconstruct their transport path and alimentation areas. Appreciable are also determining of heavy minerals using X-ray methods and character of cement of clastic rocks. Important direction of studies is also determination of material, which is filling the veins and cavities in the rock occuring in the lower part of Zechstein profile. Preliminary results of study, show that in this profile in Proboszczów, and Nowy Kościół locality (contact area of Zechstein/Rotliegend), above mentioned methods may be used with positive results. Those studies are still continuing.

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